

A commentary on Larry Carter's paper

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Larry Carter has excelled in outlining wilderness and biodiversity from a legal, and international and Australian viewpoint. He also provides a useful map of wilderness in New South Wales. I provide some comments on one aspect of wilderness and its role in the preservation of biodiversity.

My comments raise the New South Wales perspective in relation to the conservation of biodiversity in wilderness areas. In summary, the remaining wilderness areas in New South Wales do not include all habitats or incorporate sufficient areas of suitable habitat for many species and therefore cannot conserve biodiversity alone. Wilderness, however, does represent the last of our large undisturbed ecosystems and so is critical to biodiversity conservation, if it is complemented by an adequate conservation reserve system and appropriate management practices in unreserved areas.

The crucial issue for the preservation of biological diversity in wilderness in Australia is that viable areas of ecological units need to be included within wilderness areas. These areas need to include habitat of high quality for species conservation. In New South Wales the remaining wilderness areas are primarily comprised of steep, poorer quality forests and woodlands. Such areas lack the essential habitat requirements for many species. The higher quality areas were, of course, the first to be utilized by humans. The remaining wilderness areas are therefore not representative of the full range of ecological communities extant in New South Wales. For example, there are no wilderness areas recognized on the New South Wales coastal plain, except for Nadgee on the south coast. The biologically diverse north coast forests have been largely cleared, fragmented and modified. The wilderness areas on the escarpment and tablelands are comprised mostly of inaccessible areas of poorer quality, however, small remnants of tall old-growth forest do remain. The preservation of biodiversity will depend on wilderness areas including a variety of viable ecosystems and a geographical range to ensure genetic preservation.

The management of wilderness to protect biodiversity should be based on ecological requirements of species, conserving viable

populations and genetic variation within species, so as to ensure their survival into the future. The Resource Assessment Commission (1992) notes this concept for the forests: "Any attempt to maintain the biological and genetic diversity of the forest estate must seek to maintain, through time, all forest types as well as populations of their component species. In addition, populations of each species must be large enough to encompass genetic diversity within the species and to keep the risk of extinction of each species at acceptable low levels."

Given our limited knowledge of many species' requirements, one approach for biodiversity conservation is to select indicator species. Milledge, Palmer and Nelson (1991) state: "To achieve conservation of viable populations of all species with confidence requires knowledge of their individual distributions, abundances, ecological requirements and population dynamics. This task, given current time and financial constraints, is beyond researchers at present. However, an approach which could offer a partial solution to this dilemma is the adoption of management indicator species." Possingham (1990) also considers "Managing the forest for viable population sizes of a small number of key species, may be the most economic way of minimizing the loss of biodiversity. The key species should be relatively easy to study and represent the entire range of organisms present in the forests. Some potential candidates include the Powerful Owl, the Yellow-bellied Glider and the Platypus." Indicator species should be selected from each stratum and from a range of scales in home range sizes.

The Sooty and Powerful Owls have home ranges of in the order of 200–800 ha and 800–3 000 ha per pair respectively, and if the conservative minimum population of 250 pairs is adopted, this necessitates conservation of at least 75 000 ha and 250 000 ha respectively of suitable habitat. Mackowski (1987) recommended for Yellow-bellied Gliders an unfragmented area of 15 000 ha of suitable habitat using 250 home ranges of 60 ha each.

Tyndale-Biscoe and Calaby (1975) note that an "effective population number is the population size that will retain the original genetic

diversity of the species, or a large fraction of it, in perpetuity and provide the genetic means for continued evolution. It must account for natural fluctuations and be large enough to withstand the vicissitudes of fire, disease and drought; it is the lowest number that the population can fall to under these circumstances."

The biocentric values of wilderness have been recognized and enshrined in the Wilderness Act 1987 in New South Wales. The section of the Wilderness act dealing with the identification of wilderness gives the definition stating the value for biological conservation: "An area of land shall not be identified as wilderness by the Director unless the Director is of the opinion that:

- (a) the area is, together with its plant and animal communities, in a state that has not been substantially modified by humans and their works or is being restored to such a state;
- (b) the area is of a sufficient size to make its maintenance in such a state feasible; . . ."

The remaining undisturbed lands in New South Wales have limited use for urban development, forestry, intensive grazing and are likewise inadequate for the protection of a range of biological values. It is pertinent that the remaining areas that are identified as wilderness be recognized for their full range of biological values, and that areas that are important for biodiversity be included in any wilderness declaration. Nevertheless, wilderness alone will not protect biodiversity, a viable and representative conservation reserve system encompassing all ecosystems and the

maintenance of habitat components and ecosystem processes in unreserved lands is also essential.

Wilderness areas are a premium resource for the conservation of ongoing natural processes and provide the ideal situation to protect biodiversity. The crucial problem is that the remaining wilderness areas do not represent suitable habitat for all species and the suitable habitat that remains for some sensitive species is of limited extent. Wilderness preservation must therefore in the future ensure that these concepts are addressed to assist biodiversity conservation. Wilderness provides the best opportunity to maintain our biodiversity into the future if sufficient and appropriate habitats are selected.

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